

# **APPENDIX C**

## **GIS Analysis of Pre-Development Landscape Features around Lake Istokpoga**



## INTRODUCTION

An analysis was conducted to examine pre-development hydro-geographic patterns and landscape features of the Lake Istokpoga area. Information on pre-development conditions was obtained from the public land survey field notes and maps, and from soil survey information. This information was used to compile a comprehensive pre-development map of the Lake Istokpoga watershed. The results of this analysis provided clues to important landscape-level characteristics of the original lake system and how changes may have impacted the resource.

## METHODS

### General Land Office Survey Map of Pre-Development Conditions

A map of major landscape features was obtained from the 1870 General Land Office (GLO) survey field notes. These maps were acquired for 16 Township/Range blocks (**Table C-1**) and joined into a single map. Features along map borders were edge-matched and the comprehensive map was geo-rectified in ArcInfo and converted to a Geographic Information System (GIS) coverage. Field notes from the GLO survey for the Lake Istokpoga area were acquired from the Florida Department of Environmental Protection's Land Boundary Information System (LABINS) Web site available from: <http://www.labins.org/glo>.

### Pre-Development Vegetation Community Map from County Soil Survey Database

Soil taxonomic characteristics can be used to infer long-term hydrological conditions at a site. Using a relationship between average hydrological conditions for a soil taxon and vegetation community type, a map of the extent of pre-development vegetation communities was developed (Zahina *et al.* 2001). GLO survey field note information was used to verify the pre-development vegetation map. A table of GLO vegetation types along section lines was used to compare data from soil surveys in four Township/Range blocks around Lake Istokpoga (**Table C-2**).

**Table C-1.** Township/Range Blocks that were Used to Construct a Map of Lake Istokpoga Watershed Features

| <b>Township</b> | <b>Range</b> |
|-----------------|--------------|
| 34 South        | 29 East      |
| 34 South        | 30 East      |
| 34 South        | 31 East      |
| 34 South        | 32 East      |
| 35 South        | 29 East      |
| 35 South        | 30 East      |
| 35 South        | 31 East      |
| 35 South        | 32 East      |
| 36 South        | 29 East      |
| 36 South        | 30 East      |
| 36 South        | 31 East      |
| 36 South        | 32 East      |
| 37 South        | 29 East      |
| 37 South        | 30 East      |
| 37 South        | 31 East      |
| 37 South        | 32 East      |

**Table C-2.** Section Transects in the Lake Istokpoga Area that were Examined for Vegetation Descriptions.

| <b>Township</b> | <b>Range</b> |
|-----------------|--------------|
| 35 South        | 31 East      |
| 35 South        | 30 East      |
| 36 South        | 30 East      |
| 36 South        | 31 East      |

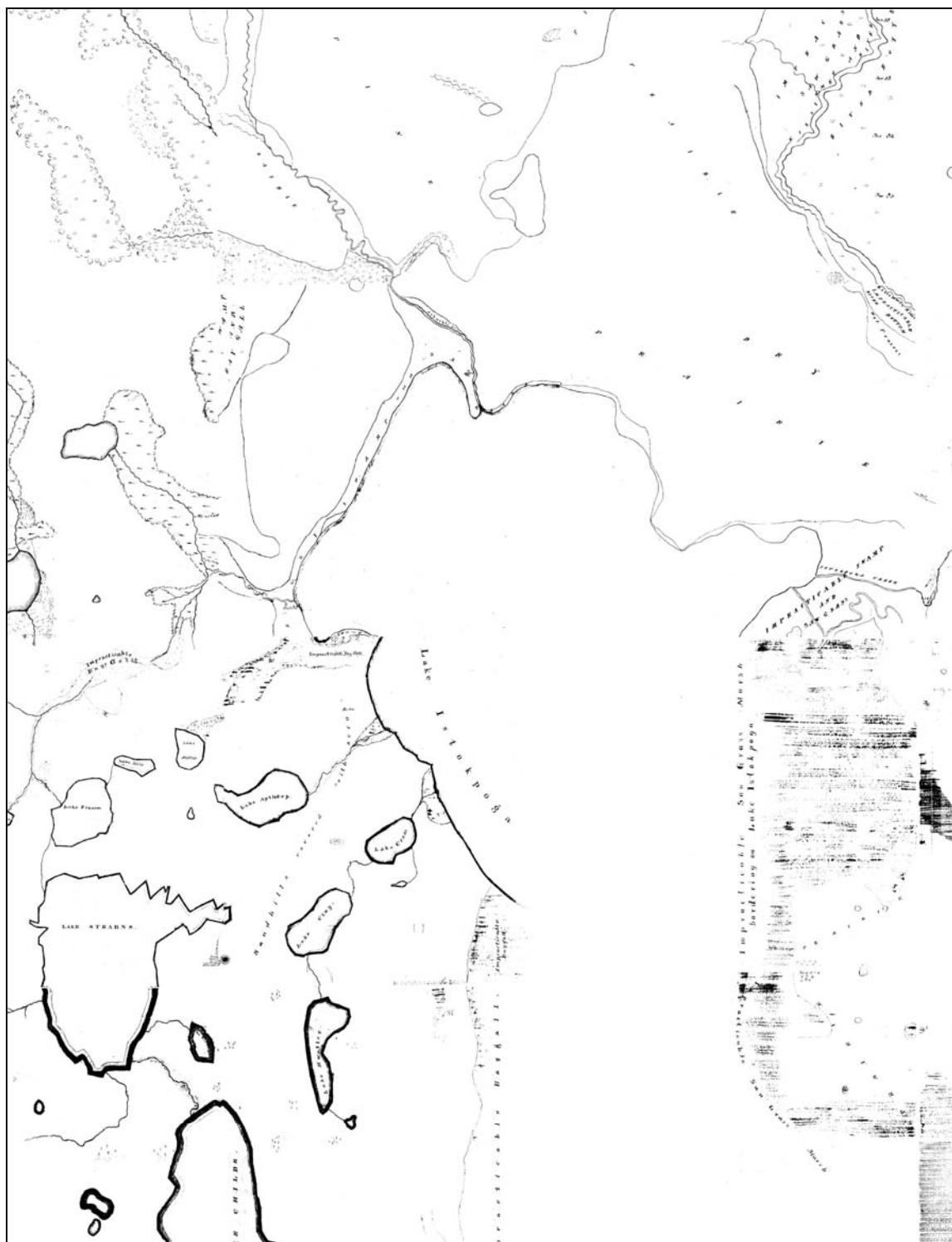
## RESULTS OF ANALYSIS

### Major Pre-Development Landscape Features of the Lake Istokpoga Area

The comprehensive map of the Lake Istokpoga watershed, generated from the original land survey maps, provides insight into the characteristics of the pre-drainage landscape (**Figure C-1**). Among the most notable are the extensive, unsurveyed perennial wetlands to the immediate southeast of the lake, and the system of smaller lakes on the southwest side, including Lake Cram, which no longer exist. The map also identifies the historic meander of the four major tributaries included in the analysis (Arbuckle Creek, Josephine Creek, Istokpoga Creek and the unnamed stream on the SW side of the lake).

Field notes and maps from the GLO were examined to determine the different vegetation community types described by the surveyors. In some cases, the distinction between some community types was not clearly defined, as the GLO notes were intended to provide general descriptions of the landscape with respect to usability of the land for settlement, agriculture and resources. For example, the term “prairie” indicated a treeless plain usually dominated by grass-like plants. Modern definitions of community types in Florida define different types of prairie, namely “wet prairie” (seasonally inundated) or “dry prairie” (associated with flatwoods and not wetlands). Examination of the field notes, maps and context of the observations usually provided clues as to which type of prairie was inferred.

Vegetation community types along section transects in the Lake Istokpoga area were compared with inferred vegetation from soils (**Table C-3**). Of the 165 section lines studied, 34 (21 %) had insufficient data to make a comparison between sources. Of the remaining 131 section transects, 123 (94 %) had a complete or partial match of information between the two sources and eight (6 %) had disagreement. A complete match occurred when both data sets provided the same information to the same level of detail. A partial match of information occurred when more detail (i.e., more community types) was given in one data set than another.



**Figure C-1.** Composite Map of the Lake Istokpoga Area from 1870 General Land Office Survey Maps.

**Table C-3.** Comparison of Field Observations of Historic Vegetation with Soil-Inferred Vegetation Communities

| <b>Township/Range/<br/>Section</b> | <b>1870 GLO Field Survey<sup>1</sup></b>                           | <b>Soil-Inferred Pre-<br/>Drainage Vegetation<sup>2</sup></b> | <b>Agreement<sup>3</sup></b> |
|------------------------------------|--|---|------------------------------|
| 35S/31E/1-2                        | Cane grass; 3rd rate pine  | Wetlands, Flatwoods   | A                            |
| 35S/31E/2-11                       | 3RD rate (dry) prairie   | Flatwoods   | A                            |
| 35S/31E/2-3                        | 3RD rate (dry) prairie   | Flatwoods   | A                            |
| 35S/31E/3-10                       | No data  | Flatwoods   | I                            |
| 35S/31E/3-4                        | 3RD rate (dry) prairie   | Flatwoods   | A                            |
| 35S/31E/4-9                        | 3RD rate (dry) prairie   | Flatwoods   | A                            |
| 35S/31E/4-5                        | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/5-8                        | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/5-6                        | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/6-7                        | Prairie (wet), 3rd rate sand                                       | Wet prairie   | A                            |
| 35S/31E/7-8                        | Prairie, 3rd rate sand   | Flatwoods, wet prairie  | A                            |
| 35S/31E/8-9                        | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/8-17                       | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/9-10                       | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/9-16                       | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/10-11                      | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/10-15                      | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/11-12                      | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/11-14                      | Prairie (dry) , 3rd rate sand                                      | Flatwoods, Wetlands   | A                            |
| 35S/31E/12-13                      | Prairie (dry) , 3rd rate sand                                      | Flatwoods, Wetlands   | A                            |
| 35S/31E/13-24                      | Prairie (dry) , 3rd rate sand                                      | Flatwoods, Wetlands   | A                            |
| 35S/31E/13-14                      | Prairie (dry) , 3rd rate sand                                      | Flatwoods, Wetlands   | A                            |
| 35S/31E/14-23                      | Prairie (dry) , 3rd rate sand                                      | Flatwoods, Wetlands   | A                            |
| 35S/31E/14-15                      | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/15-22                      | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/15-16                      | Prairie (dry) , 3rd rate sand                                      | Flatwoods, wet prairie  | A                            |
| 35S/31E/16-21                      | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/16-17                      | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/17-20                      | Prairie (dry), sand, (cypress), lake                               | Flatwoods, wetlands   | A                            |
| 35S/31E/17-18                      | Lake, (cypress), wetland   | Flatwoods, water  | A                            |
| 35S/31E/20-21                      | Prairie (dry), scrubby, 3rd rate sand                              | Flatwoods   | A                            |
| 35S/31E/20-29                      | Prairie (dry), scrub, 3rd rate sand, lake                          | Flatwoods   | P                            |
| 35S/31E/21-22                      | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/21-28                      | Prairie, 3rd rate sand   | Wetlands, wet prairie   | A                            |
| 35S/31E/22-23                      | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/22-27                      | Prairie (dry) , 3rd rate sand, Istokpoga Creek with assoc wetlands | Flatwoods   | P                            |
| 35S/31E/23-24                      | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/23-26                      | Istokpoga Creek with assoc wetlands                                | Flatwoods, Wetlands   | A                            |
| 35S/31E/24-25                      | Prairie (dry) , 3rd rate sand                                      | Flatwoods   | A                            |
| 35S/31E/26-27                      | Unsurveyed, lake area  | Flatwoods   | I                            |

**Table C-3.** Comparison of Field Observations of Historic Vegetation with Soil-Inferred Vegetation Communities (Continued).

| <b>Township/Range/<br/>Section</b> | <b>1870 GLO Field Survey<sup>1</sup></b>               | <b>Soil-Inferred Pre-<br/>Drainage Vegetation<sup>2</sup></b> | <b>Agreement<sup>3</sup></b> |
|------------------------------------|--|---|------------------------------|
| 35S/31E/27-34                      | Unsurveyed, lake area                                  | Wet prairie, wetlands   | I                            |
| 35S/31E/27-28                      | Unsurveyed, lake area                                  | Wetlands  | I                            |
| 35S/31E/28-33                      | Unsurveyed, lake area                                  | Flatwoods, wetlands   | I                            |
| 35S/31E/28-29                      | Swamp, wet prairie, lake (fringe)                      | Wetlands, flatwoods   | P                            |
| 35S/31E/29-32                      | Unsurveyed, lake area                                  | Wetlands, flatwoods   | I                            |
| 35S/31E/32-33                      | Unsurveyed, lake area                                  | Water   | I                            |
| 35S/31E/33-34                      | Unsurveyed   | Flatwoods   | I                            |
| 35S/31E/34-35                      | Unsurveyed   | Flatwoods, wetlands   | I                            |
| 35S/30E/1-2                        | Prairie (dry) , 3rd rate sand                          | Flatwoods   | A                            |
| 35S/30E/2-11                       | Prairie (dry) , 3rd rate sand, Arbuckle Creek wetlands | Flatwoods   | P                            |
| 35S/30E/2-3                        | Water (lake fringe)                                    | Wetlands  | P                            |
| 35S/30E/3-16                       | Willow, sawgrass, boggy, inundated                     | Wetlands  | A                            |
| 35S/30E/3-4                        | Low muddy dark rich soil                               | Flatwoods, Wetlands (Arbuckle Creek floodplain)               | A                            |
| 35S/30E/4-5                        | Unsurveyed   | Flatwoods, Wet Prairie  | I                            |
| 35S/30E/5-8                        | Pine, prairie, 3rd rate sand                           | Scrub, Flatwoods  | A                            |
| 35S/30E/5-6                        | Boggy swamp, 3rd rate pineland                         | Wetlands  | P                            |
| 35S/30E/6-7                        | Bay swamp  | Wetlands  | A                            |
| 35S/30E/7-8                        | Prairie, pine island                                   | Flatwoods   | A                            |
| 35S/30E/7-18                       | Prairie, boggy pine, swamp                             | Flatwoods, Wetlands   | A                            |
| 35S/30E/8-9                        | Prairie, 3rd rate sand                                 | Flatwoods   | A                            |
| 35S/30E/8-17                       | Prairie, 3rd rate sand                                 | Flatwoods   | A                            |
| 35S/30E/9-10                       | Sawgrass, lake   | Flatwoods   | D                            |
| 35S/30E/9-16                       | Prairie, 3rd rate sand                                 | Flatwoods   | A                            |
| 35S/30E/10-11                      | Arbuckle Creek, wetlands                               | Wetlands  | A                            |
| 35S/30E/11-12                      | Prairie, 3rd rate sand                                 | Flatwoods, wetlands   | A                            |
| 35S/30E/12-13                      | Unsurveyed lake  | Wetlands  | I                            |
| 35S/30E/13-14                      | Unsurveyed lake  | Flatwoods, wetlands   | I                            |
| 35S/30E/14-23                      | Unsurveyed lake  | Wetlands, wet prairie   | I                            |
| 35S/30E/14-15                      | Unsurveyed lake  | Uplands   | I                            |
| 35S/30E/15-22                      | Unsurveyed lake  | Flatwoods, no data  | I                            |
| 35S/30E/15-16                      | Sawgrass   | Wetlands, no data   | I                            |
| 35S/30E/16-21                      | Sawgrass, boggy & impassible wetland                   | Wet prairie, wetlands   | A                            |
| 35S/30E/16-17                      | Prairie, pine island, 3rd rate sand                    | Flatwoods, no data  | I                            |
| 35S/30E/17-20                      | Prairie, 3rd rate sand                                 | Flatwoods, wet prairie  | A                            |
| 35S/30E/17-18                      | Prairie, 3rd rate sand                                 | Flatwoods, uplands  | A                            |
| 35S/30E/18-19                      | Prairie, 3rd rate sand, pinelands                      | Flatwoods, uplands  | A                            |
| 35S/30E/19-20                      | Prairie, 3rd rate sand                                 | Flatwoods   | A                            |
| 35S/30E/19-30                      | Prairie & pine of 3rd rate                             | Flatwoods, uplands  | A                            |
| 35S/30E/20-21                      | Pine & prairie, 3rd rate sand, edge of swamp (maple)   | Flatwoods, wet prairie  | A                            |



**Table C-3.** Comparison of Field Observations of Historic Vegetation with Soil-Inferred Vegetation Communities (Continued).

| <b>Township/Range/<br/>Section</b> | <b>1870 GLO Field Survey<sup>1</sup></b>             | <b>Soil-Inferred Pre-<br/>Drainage Vegetation<sup>2</sup></b> | <b>Agreement<sup>3</sup></b> |
|------------------------------------|--|---|------------------------------|
| 35S/30E/20-29                      | Prairie  | Wet prairie   | A                            |
| 35S/30E/21-22                      | No survey  | Wet prairie   | I                            |
| 35S/30E/21-28                      | No survey  | Wet prairie, water  | I                            |
| 35S/30E/22-23                      | No survey  | Water (lake)  | I                            |
| 35S/30E/28-29                      | No survey  | Wet prairie, water  | I                            |
| 35S/30E/29-32                      | Swamp, lake edge                                     | Wet prairie   | P                            |
| 35S/30E/29-30                      | Prairie of 3rd rate, pineland                        | Upland, wet prairie   | A                            |
| 35S/30E/30-31                      | Leslie Creek, swamp                                  | Wetlands  | A                            |
| 35S/30E/31-32                      | Swamp, Leslie Creek                                  | Wet prairie   | P                            |
| 35S/30E/31 &<br>36S/30E/6          | No data  | Highlands   | I                            |
| 35S/30E/32 &<br>36S/30E/5          | No data  | Wetlands  | I                            |
| 36S/30E/3-4                        | Lake, fringing swamp                                 | Wet prairie   | P                            |
| 36S/30E/4-9                        | No data  | Highlands, uplands  | I                            |
| 36S/30E/4-5                        | Bay swamp  | Flatwoods   | D                            |
| 36S/30E/5-8                        | Sand ridges  | Flatwoods, wet prairie  | A                            |
| 36S/30E/5-6                        | Bay swamp  | Highlands   | D                            |
| 36S/30E/7-8                        | Bay swamp, sand, pine                                | Highlands   | P                            |
| 36S/30E/7-18                       | Sand ridge, low scrub                                | Highlands, wetlands   | A                            |
| 36S/30E/8-9                        | Low sand ridges                                      | Flatwoods   | A                            |
| 36S/30E/8-17                       | Pines, swampy creek bed                              | Flatwoods, uplands  | P                            |
| 36S/30E/9-10                       | Creek bed  | Wet prairie   | P                            |
| 36S/30E/9-16                       | Level sand with scrub                                | Uplands, wetlands   | A                            |
| 36S/30E/10-15                      | Sand and low scrub                                   | Water, wetlands   | D                            |
| 36S/30E/15-16                      | Bay swamp  | Wetlands, wet prairie   | A                            |
| 36S/30E/16-21                      | Sand ridges to lake shore (L. Cram)                  | Wet prairie, uplands  | A                            |
| 36S/30E/16-17                      | Saw palmetto   | Wetlands, wet prairie   | P                            |
| 36S/30E/17-20                      | High sand ridges, scrub, L. Apthorp,<br>saw palmetto | Uplands, flatwoods  | A                            |
| 36S/30E/17-18                      | Lake (Apthorp)                                       | Wet prairie, wetlands   | P                            |
| 36S/30E/18-19                      | Saw palmetto   | Highlands   | A                            |
| 36S/30E/19-20                      | Sand ridges, low scrub                               | Flatwoods   | P                            |
| 36S/30E/19-30                      | Scrub, sand  | Flatwoods, uplands  | A                            |
| 36S/30E/20-21                      | Low sand ridges                                      | Flatwoods   | A                            |
| 36S/30E/20-29                      | Lake edge  | Wet prairie   | P                            |
| 36S/30E/21-22                      | Low sand hills                                       | Wet prairie   | D                            |
| 36S/30E/21-28                      | Creek bed, lake (Cram), low scrub                    | Uplands, wetlands   | A                            |
| 36S/30E/22-23                      | Low sand hills, palmetto prairie                     | Highlands   | A                            |
| 36S/30E/22-27                      | Creek bed, low palmetto prairie                      | Wet prairie, water  | A                            |
| 36S/30E/25-36                      | No data  | Water, wetlands   | I                            |
| 36S/30E/26-27                      | Saw palmetto   | Water   | D                            |

**Table C-3.** Comparison of Field Observations of Historic Vegetation with Soil-Inferred Vegetation Communities (Continued).

| <b>Township/Range/<br/>Section</b> | <b>1870 GLO Field Survey<sup>1</sup></b> | <b>Soil-Inferred Pre-<br/>Drainage Vegetation<sup>2</sup></b> | <b>Agreement<sup>3</sup></b> |
|------------------------------------|--|---|------------------------------|
| 36S/30E/27-34                      | Saw palmetto low prairie                 | Wet prairie   | A                            |
| 36S/30E/27-28                      | Sand ridge, palmettos, lakes             | Wet prairie   | P                            |
| 36S/30E/28-33                      | Low sand ridge                           | Highlands   | A                            |
| 36S/30E/28-29                      | Lake Clay, boggy prairie                 | Highlands, wet prairie  | P                            |
| 36S/30E/29-32                      | Lake Clay, low scrub                     | Water   | P                            |
| 36S/30E/29-30                      | Scrub                                    | Wet prairie   | D                            |
| 36S/30E/30-31                      | Sand ridge, low scrub                    | N/A   | I                            |
| 36S/30E/31-32                      | Scrub                                    | Highlands   | A                            |
| 36S/30E/32-33                      | Pine, boggy prairie                      | Highlands   | P                            |
| 36S/30E/32 &<br>37S/30E/5          | Level scrub, low prairie                 | Highlands, wetlands,<br>water                                 | P                            |
| 36S/30E/33-34                      | Sand ridge                               | Highlands   | A                            |
| 36S/30E/33 &<br>37S/30E/4          | Pine, scrub, low palmetto                | Highlands   | A                            |
| 36S/30E/34-35                      | Low pinelands                            | Water, wetlands   | A                            |
| 36S/30E/34 &<br>37S/30E/3          | Bay swamp, scrub                         | Wetlands, Highlands   | A                            |
| 36S/30E/35-36                      | Bay swamp, impassible swamp              | Water, wetlands   | A                            |
| 36S/30E/35 &<br>37S/30E/2          | Bay swamp, impassible swamp              | Water, wetlands   | A                            |
| 36S/30E/36                         | No survey                                | Wetlands  | I                            |
| 36S/31E/1 &<br>36S/32E/6           | No survey                                | Flatwoods   | I                            |
| 36S/31E/1-12                       | Sawgrass, 2nd rate prairie               | Flatwoods, wet prairie  | A                            |
| 36S/31E/1-2                        | Inundated                                | Wetlands  | A                            |
| 36S/31E/2-11                       | Sawgrass, water                          | Wetlands  | A                            |
| 36S/31E/2-3                        | No data                                  | Flatwoods, wetlands   | I                            |
| 36S/31E/3-10                       | No data                                  | Wetlands  | I                            |
| 36S/31E/10-11                      | Sawgrass, water                          | Wet prairie   | P                            |
| 36S/31E/11-12                      | Sawgrass, water                          | Wetlands  | A                            |
| 36S/31E/11-14                      | Sawgrass, water                          | Wetlands  | A                            |
| 36S/31E/12 &<br>36S/32E/7          | Sawgrass, water                          | Flatwoods   | D                            |
| 36S/31E/12-13                      | Sawgrass, water                          | Wet prairie   | P                            |
| 36S/31E/13- &<br>36S/32E/18        | No data                                  | Wetlands, wet prairie   | I                            |
| 36S/31E/13-24                      | Inundated                                | Flatwoods, wet prairie,<br>wetlands                           | P                            |
| 36S/31E/13-14                      | Inundated                                | Wet prairie, flatwoods  | P                            |
| 36S/31E/14-22                      | Sawgrass, water                          | Wetlands, wet prairie,<br>flatwoods                           | P                            |
| 36S/31E/14-15                      | Inundated                                | Wetlands  | A                            |
| 36S/31E/22-23                      | Inundated                                | Wetlands  | A                            |
| 36S/31E/23-24                      | Inundated                                | Wetlands, wet prairie   | A                            |

**Table C-3.** Comparison of Field Observations of Historic Vegetation with Soil-Inferred Vegetation Communities (Continued).

| <b>Township/Range/<br/>Section</b> | <b>1870 GLO Field Survey<sup>1</sup></b> | <b>Soil-Inferred Pre-<br/>Drainage Vegetation<sup>2</sup></b> | <b>Agreement<sup>3</sup></b> |
|------------------------------------|--|---|------------------------------|
| 36S/31E/23-26                      | Low lands                                | Wetlands, wet prairie   | A                            |
| 36S/31E/24 &<br>36S/32E/19         | Sawgrass, low prairie, ponds             | Wetlands, wet prairie,<br>flatwoods                           | A                            |
| 36S/31E/24-25                      | Sawgrass, low prairie, ponds             | Wetlands  | A                            |
| 36S/31E/25 &<br>36S/32E/30         | Ponds, prairie, marsh                    | Wet prairie, flatwoods  | A                            |
| 36S/31E/25-36                      | 2nd rate prairie                         | Flatwoods, wetlands   | A                            |
| 36S/31E/25-26                      | Ponds, prairie, marsh                    | Wetlands, wet prairie,<br>flatwoods                           | A                            |
| 36S/31E/26-35                      | 2nd rate prairie, cabbage palm           | Flatwoods   | A                            |
| 36S/31E/26-27                      | Marsh, 2nd rate prairie, cabbage<br>palm | Wetlands, wet prairie   | A                            |
| 36S/31E/34-35                      | 2nd rate prairie, cabbage palm           | Wet Prairie   | A                            |
| 36S/31E/35-36                      | No data                                  | Flatwoods   | I                            |
| 36S/31E/35 &<br>37S/31E/2          | No data                                  | Wetlands, wet prairie   | I                            |
| 36S/31E/36 &<br>36S/32E/31         | No data                                  | Wetlands, flatwoods   | I                            |

1. General Land Office Field Notes, 1870.

2. From Zahina *et al.*, 2001.

3. C=complete, D=disagreement, P=partial, I=insufficient data to determine.

## LITERATURE CITED

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